S/133/62/000/006/012/015
A054/A127

Continuous electrolytic pickling of...

plied instead of lead ones. The pickling of a 1.6-mm diameter 1Kh18N9T steel wire at current densities of 34 - 42 a/dm^2 for 12 seconds yielded the optimum result, a bright, clean surface. When applying the possible maximum current density for the given conditions (42 a/dm^2) a satisfactory surface was obtained in 9.6 seconds. Electrolyte C) gave results similar to A); electrolyte B) was unsatisfactory. Increasing the current density above 40 a/dm^2 did not accelerate the process: the required time could not be shortened under 12 seconds. The alkaline solution and electrolytes A) and C) can also be applied in pickling carbon steel wire. In that case, at a current density of 15 - 18 a/dm^2 the output of the process increases by a factor of 1.6 - 1.7 as compared with the continuous chemical process. The industrial-scale tests were carried out by setting 90-mm wide baths of 1Kh18N9T steel in the conventional thermal pickling equipment, filled with the following solutions:

Alkaline bath: 65% NaOH + 30% $NaNO_3$ + 5% NaCl at 460 - 470°C
Acidic bath: 18% H_2SO_4 + 1% NaCl + 5% $NaNO_3$ at 80 - 85°C
Bleaching bath: 8% HNO_3 at room temperature

In pickling 3.6 mm diameter OKh18N9T and Kh18N11M steel wires, a clean, bright and scale-free surface was obtained at a rate of 10.5 m/min, (20 sec. in the al-

Card 2/3

kaline, 29 sec. in the acidic and 11 sec. in the bleaching bath). In the simultaneous pickling of 24 wires, at a rate of 20 ton/day, a generator power of 140 kw (51 v, 2,750 a) is required. In pickling stainless steel strips, (0.5 mm thick, 40 mm wide) in the pilot installation, the cathode and anode plates (0.6 mm long in the alkaline bath and 1 m long in the acidic bath) were set parallel to the movement of the strip. On account of the larger surface of the strip, the maximum current density was lowered to 12 - 15 a/dm^2. The strips tested were made of 1Kh18N9T, 1Kh18N9, ЭИ 432 (EI432), ЭИ 435 (EI435), Х13Н4Г9 (Kh13N4G9) and 1Х13 (1Kh13) steel grades. In the alkaline bath 100-% NaOH (at 450°C), in the acidic bath solutions A) and C) (at 70°C) were tested. A satisfactory surface was obtained with these solutions, when keeping the strip 6 - 9 seconds in the alkaline bath and 9 - 15 seconds in the acidic one. As in currentless continuous chemical pickling - under industrial conditions - the pickling of the same strip requires 82 seconds, the electrolytic method increases the output of the process 3 - 4 times. For pickling strips 0.5 mm thick and 400 mm wide at a current density of 15 a/dm^2 and with electrode plates 7 m long, the generator power required will be 1,260 kw (150 v, 8,400 a). There is 1 figure.

ASSOCIATION: Zavod "Serp i molot" ("Serp i molot" Plant)

Card 3/3

ZHETVIN, N.P., kand.tekhn.nauk; ZUBREV, I.P., inzh.; BOLOUSOV, A.S., inzh.; ANDRATSKIY, K.K., inzh.; DIOMIDOVA, A.A., inzh.

Treatment of rope wire in continuous heat treating and pickling units. Stal' 22 no.7:661-663 Jl '62. (MIRA 15:7)
(Wire industry)

ZHETVIN, N.P., kand.tekhn.nauk; GORBATENKO, I.V., inzh.; KONTSEVAYA, Ye.M., inzh.

Effect of chemical composition on the properties of peened Kh18N9 steel. Metalloved. i term. obr. met. no.1:45-41 Ja '63. (MIRA 16:2)

1. Zavod "Serp i molot".
(Steel alloys—Testing)

ZHETVIN, N.P., kand.tekhn.nauk; FREYDIN, L.M., inzh.; RUDAKOV, L.M., inzh.

New developments in research. Stal' 23 no.7:652 Jl '63.
(MIRA 16:9)

(Steel—Heat treatment)

ZHETVIN, N.P., kand.tekhn.nauk

New developments in research. Stal' 24 no.6:575 Je '64. (MIRA 17:9)

ACC NR: AT6034458 (A) SOURCE CODE: UR/0000/66/000/000/0213/0218

AUTHOR: Zhetvin, N. P.; Frid, Ya. L.; Kontsevaya, Ye. M.; Sokol, I. Ya.; Lyukovich, V. L.

ORG: none

TITLE: Study of the kinetics of hardening and softening of heat resistant alloys with the aim of choosing the temperature interval for hot plastic deformation and heat treatment

SOURCE: AN SSSR. Institut metallurgii. Svoystva i primeneniye zharoprochnykh splavov (Properties and application of heat resistant alloys). Moscow, Izd-vo Nauka, 1966, 213-218

TOPIC TAGS: heat resistant alloy, metal deformation, metal heat treatment

ABSTRACT: The experiments were carried out on hot rolled samples of alloy Brand EI828 with a thickness of 2-3 mm, and cold rolled samples of alloy Brand EP460 with a thickness of 1.0-1.5 mm. The chemical composition of the alloys is shown in the following table:

Card 1/2

ACC NR: AT6034458

Alloy	C	Mn	Si	S	P	Ni	Cr
EI828.	0,03	traces	0,11	0,006	0,005	base	9,55
EP460.	0,03	traces	0,07	0,010	0,008	base	8,85

Alloy	Mo	W	Ti	B	Al	Ce	Nb
EI828.	8,81	5,01	0,06	0,008	4,50	0,15	-
EP460.	2,24	-	3,0	-	1,8	-	1,87

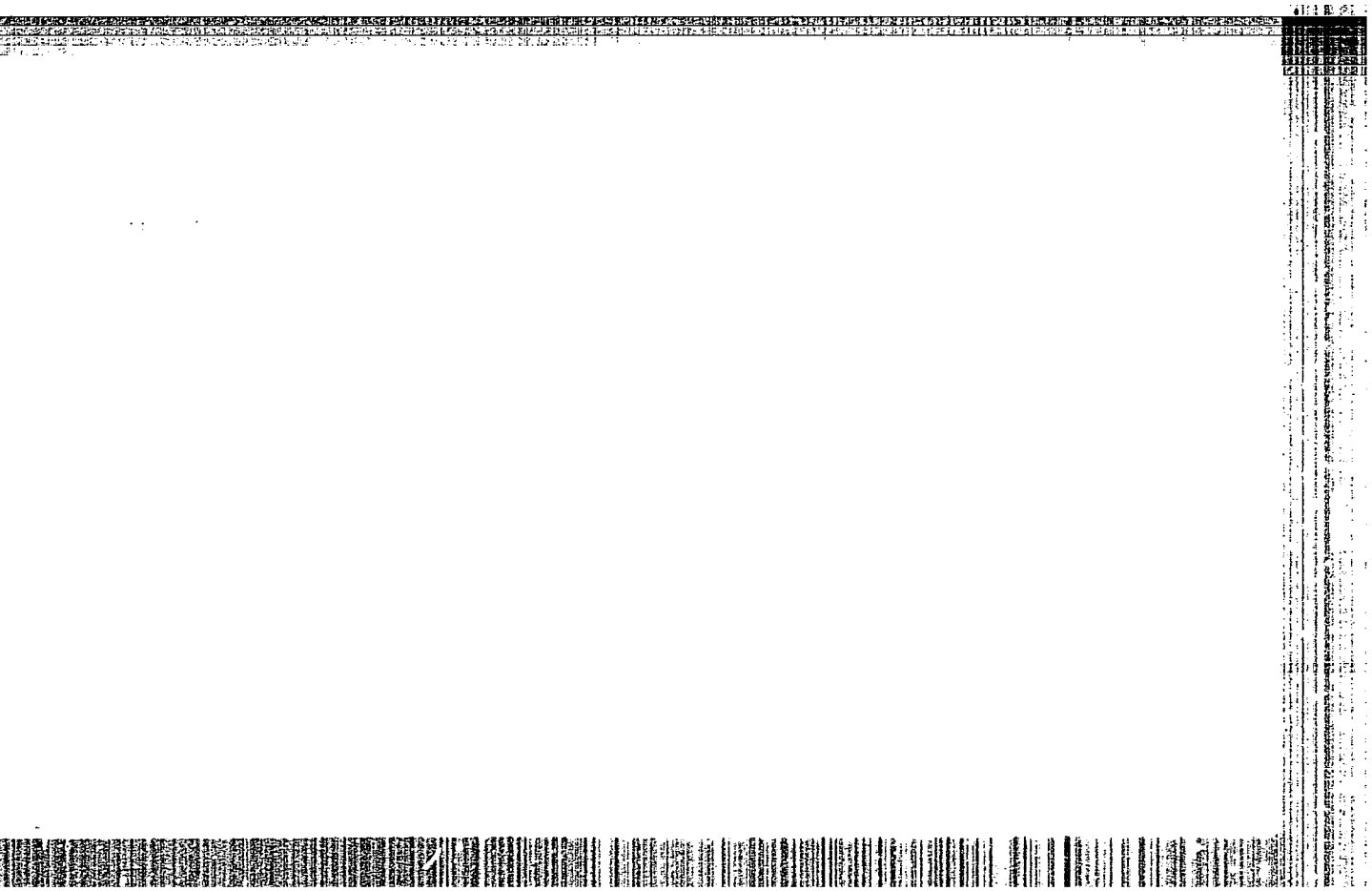
The samples were subjected to hardening in a laboratory electric furnace at a temperature of 950-1200°C, and aging at temperatures of 650-1000° with a holding time up to 12 hours. The mechanical properties (σ_b, δ_5, HB, a_k) and the microstructure were determined before and after aging. A phase analysis was made of the precipitates which separated out from the hardened and aged samples of alloy EI828, and a dilatometric examination of the samples was made on a differential optical dilatometer. On the basis of the experimental data, a study was made of the kinetics and the temperature interval for the formation of the intermetallic phase of the type Ni_3Al or $Ni_3(Ti, Al)$. The following conclusions were drawn: 1) the decomposition of the solid solutions at aging temperatures starts the minute the aging process starts; 2) a maximum degree of hardening is achieved (at 800°) in an alloy containing 27% of the intermetallic phase; 3) weakening of the aged alloy Brand EP460 is reached on heating to 1050° and above, while for alloy EI828, this temperature is shifted to 1200°. "The x ray analysis was done by S. S. Potapova, and the analysis of the intermetallic precipitate by A. P. Pogodina.". Orig. art. has: 5 figures and 2 tables.

SUB CODE: 11/ SUBM DATE: 10Jun66/ ORIG REF: 004/ OTH REF: 001

Card 3/3

ZHETVIN, N.P., kand.tekhn.nauk

New developments in research. Stal' 24 no.7:663,667 Jl '64.
(MIRA 18:1)



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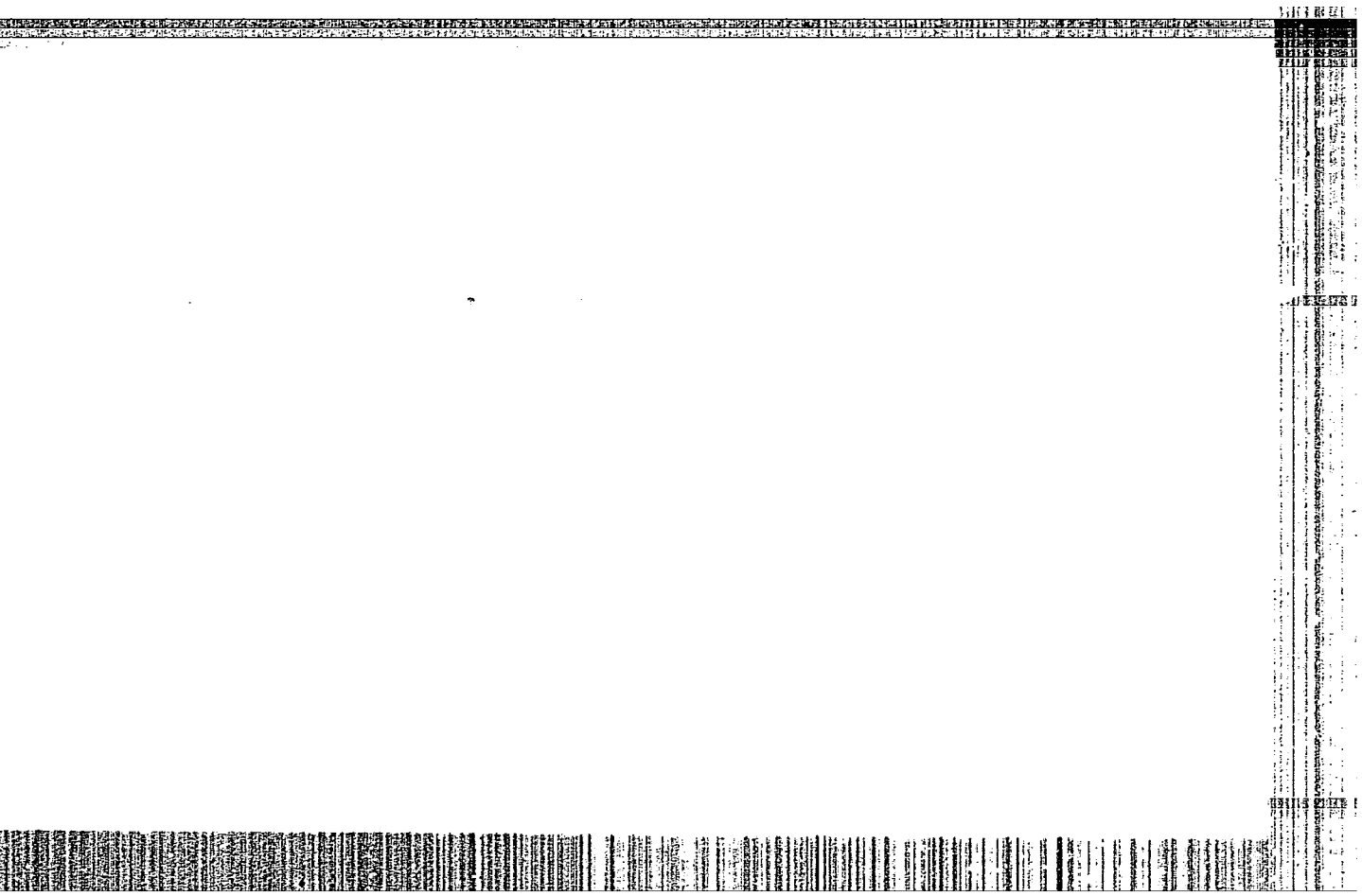

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R002064720012-7"

ZHETVIN, Nikita Petrovich; RAKHOVSKAYA, Faina Samoylovna; USHAKOV, Viktor Ivanovich; LEDKOV, V.G., retsenzent;

[Scale removal from metal surfaces] Udalenie okaliny s poverkhnosti metalla. Izd.2., perer. i dop. Moskva, Izd-vo "Metallurgiia," 1964. 194 p. (MIRA 17:7)

ZHETVIN, N.P., kand.tekhn.nauk

New developments in research. Stal' 24 no.6:548 Je '64. (MIRA 17:9)

PANCHENKO, Ye.V.; PANSHINA, M.M.; REKALO, I.B.; BLINKOVA, T.M.; KRYLOVA, L.I.; ZHDANOV, V.V.; ZHEMZN, N.P.; LYUSHITS, B.G.

Residual stresses in billets made of A40G steel. Stan. i instr. 36 no.8:27-29 Ag '65. (MIRA 18:9)

ZHEUROV, L.V.

Testing "zernogranulit" 80/20. Met. i gornorud. prom. no.3:74-75 My-Je '64. (MIRA 17:10)

ZHEUROV, L.V.

Work practices in using multistage bits in air drilling at the "Chikalovskii" strip mine. Met. i gornorud. prom. no.3:82 My-Je '65. (MIRA 18:11)

ZHEVAGINA, P. A.

1(0) P.3 PHASE I BOOK EXPLOITATION SOV/2835

Moscow. Aviatsionnyy institut im. Sergo Ordzhonikidze

Voprosy proyektirovaniya samoletov; sbornik statey (Problems in Aircraft Designing; Collection of Articles) Moscow, Oborongiz, 1959. 74 p. (Series: Its: Trudy, vyp. 108) Errata slip inserted. 3,100 copies printed.

Sponsoring Agency: Ministerstvo vysshego obrazovaniya SSSR.

Ed.: A.L. Gimmel'farb, Candidate of Technical Sciences, Docent; Ed. of Publishing House: K. I. Grigorash; Tech. Ed.: L. A. Pukhlikov; Managing Ed.: A.S. Zaymovskaya, Engineer.

PURPOSE: This book is intended for personnel in the design offices of aircraft plants. It may also be used by students at aviation institutes.

COVERAGE: This collection of articles describes the results of theoretical and experimental investigation connected with the determination, during the designing stage, of basic aircraft and wing parameters, total weight of aircraft and its components, type of engines and the amount of fuel. Problems of

Card 1/4

aircraft strength and stability are also considered. No personalities are mentioned. References appear in the text.

TABLE OF CONTENTS:

reinforced panels used in ship and aircraft construction. He analyses the influence of separate factors on the stability of the panels and indicates practical methods of choosing, in the first approximation, the most convenient disposition of basic elements of the panel.

AVAILABLE: Library of Congress

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11-23-59

STURMAN, A.V., veter. vrach (Strashenskiy rayon, Moldavskaya SSR); BULGAKOV, Yu.N., veter. fel'dsher (Strashenskiy rayon, Moldavskaya SSR); KAL'NITSKIY, P.I., veter. vrach (Strashenskiy rayon, Moldavskaya SSR); OCHAKOVSKIY, Z.M., veter. vrach (Strashenskiy rayon, Moldavskaya SSR); GOTSENOGA, A.D. (Strashenskiy rayon, Moldavskoy SSR); ABRAMYAN, G.I., veter. vrach; MEKHTIYEV, M.G., veter. fel'dsher (s.Shirozlu, Vedinskogo rayona Armyanskoy SSR); KIRAKOSYAN, A.A., veter. vrach; GEORGIYEV, Yu.P., veter. vrach; LOMAKIN, A.M., nauchnyy sotrudnik; SHEPELEV, L.A., veter. vrach.; TARASOV, I.I., assistent; ROMASHKIN, V.M., veter. tekhnik; ANDRIYAN, Ye.A.; BARTENEV, V.S.; KOROL', Ye.I., veter. tekhnik; YEROSHENKO, A.K., aspirant; BANZEN, Ya.P.; SARAYKIN, I.M., prof.; ZHEVAGIN, A.N., veter. vrach; BUT'YANOV, D.D., veter. vrach (Klimovichskiy rayon, Mogilevskoy oblasti BSSR); SHALYGIN, B.V., veter. vrach (Klimovichskiy rayon, Mogilevskoy oblasti, BSSR); RYABOKON, G.T., veter. fel'dsher; MOVSUMZADE, K.K., prof.; DUGIN, G.L., aspirant; TITOV, G.I., nauchnyy sotrudnik; MEDVEDEV, I.G., veter. vrach.; ALIKAYEV, V.A.; ALLENOV, O.A., veter.vrach.

Prophylaxis and treatment of noninfectious diseases in calves and piglets. Veterinariia 40 no.2:40-47 F '63. (MIRA 17:2)

1. Ul'yanovskaya oblastnaya veterinarno-bakteriologicheskaya laboratoriya (for Sturman). 2. Kolkhoz imeni Kirova. Volokonovskogo

(Continued on next card)

STURMAN, A.V.— (continued) Card 2.

rayona, Belgorodskoy oblasti (for Bulgakov). 3. Sovkhoz "Akhuryanskiy", ArmSSR (for Abramyan). 4. El'khotovskaya veterinarno-bakteriologicheskaya laboratoriya Severo-Osetinskoy ASSR (for Allenov). 5. Shagatskiy veterinarnyy uchastok, Sisianskogo rayona, ArmSSR (for Kirakosyan). 6. Sovkhoz "Vekhno", Pskovskoy oblasti (for Georgiyev). 7. Leningradskaya lesotekhnicheskaya akademiya imeni S.M.Kirova (for Lomakin). 8. Siverskiy veterinarnyy uchastok, Gatchinskogo rayona Leningradskoy oblasti (for Shepelev). 9. Saratovskiy zooveterinarnyy institut (for Tarasov, Yeroshenko). 10. Sovkhoz "Gorodishchenskiy" Penzenskoy oblasti (for Romashkin). 11. Glavnyy veterinarnyy vrach plemennogo sovkhoza imeni Litvinova, Frunzenskogo rayona, Luganskoy oblasti (for Andriyan). 12. Svinosovkhoz imeni Podtelkova, Kosharskogo rayona, Rostovskoy oblasti (for Bartenev). 13. Sovkhoz "Shakhter" Donetskoy oblasti (for Korol'). 14. Zernosovkhoz "Mikhailovskiy" TSelinnogo kraya (for Banzen). 15. Kishinevskiy sel'skokhozyaystvennyy institut (for Saraykin, Zhevagin). 16. Klimovichskiy rayon, Mogilevskoy oblasti, BSSR (for But'yanov, Shalygin). 17. Kolkhoz imeni Shevchenko Tal'novskogo rayona, Cherkasskoy oblasti, UkrSSR (for Ryabokon'). 18. Leningradskiy veterinarnyy institut (for Movsum-zade, Dugin). 19. Buryatskaya nauchno-proizvodstvennaya veterinarnaya laboratoriya (for Titov). 20. Buryatskiy sel'skokhozyaystvennyy institut (for Medvedev).

ZHEVAGINA, Z. Z.

"The Determination of the Parameters of Compressed Laminated Panels Containing Filler Material." Cand Tech Sci, Moscow Order of Lenin Aviation Inst imeni Sergo Ordzhonikidze, Moscow, 1955. (KL, No 9, Feb 55)

SO: Sum. No. 631, 26 Aug 55-Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (14)

ZHEVAGO, K.A.

[Internal-combustion engines used in oil-well drillin] Dvigateli vnutrennego sgoraniia, primeniaemye v burenii skvashin. Moskva, Gos. nauchno-tekhn. izd-vo neftianoi i gorno-toplivnoi lit-ry, 1953. 347 p. (MLRA 6:12)
(Gas and oil engines) (Petroleum--Well boring)

ZHEVAGO, K.A. Prinimal uchastiye MORGULIS, Yu.B.; BULATOV, S.I., red. izd-va; EL'KIND, V.D., tekhn. red.; UVAROVA, A.F., tekhn. red.

[High-speed diesel engines; design, assembly and operation]Bystrokhodnye dizeli; ustroistvo, montazh i ekspluatatsiia. Moskva, Mashgiz, 1962. 399 p. (MIRA 16:1)
(Diesel engines)

ZHEVAGO, Konstantin Aleksandrovich; PORTNOY, Teodor Zinov'yevich; SHKOL'NIKOV, Bernard Markovich; SOLGANIK, G.Ya., ved. red.

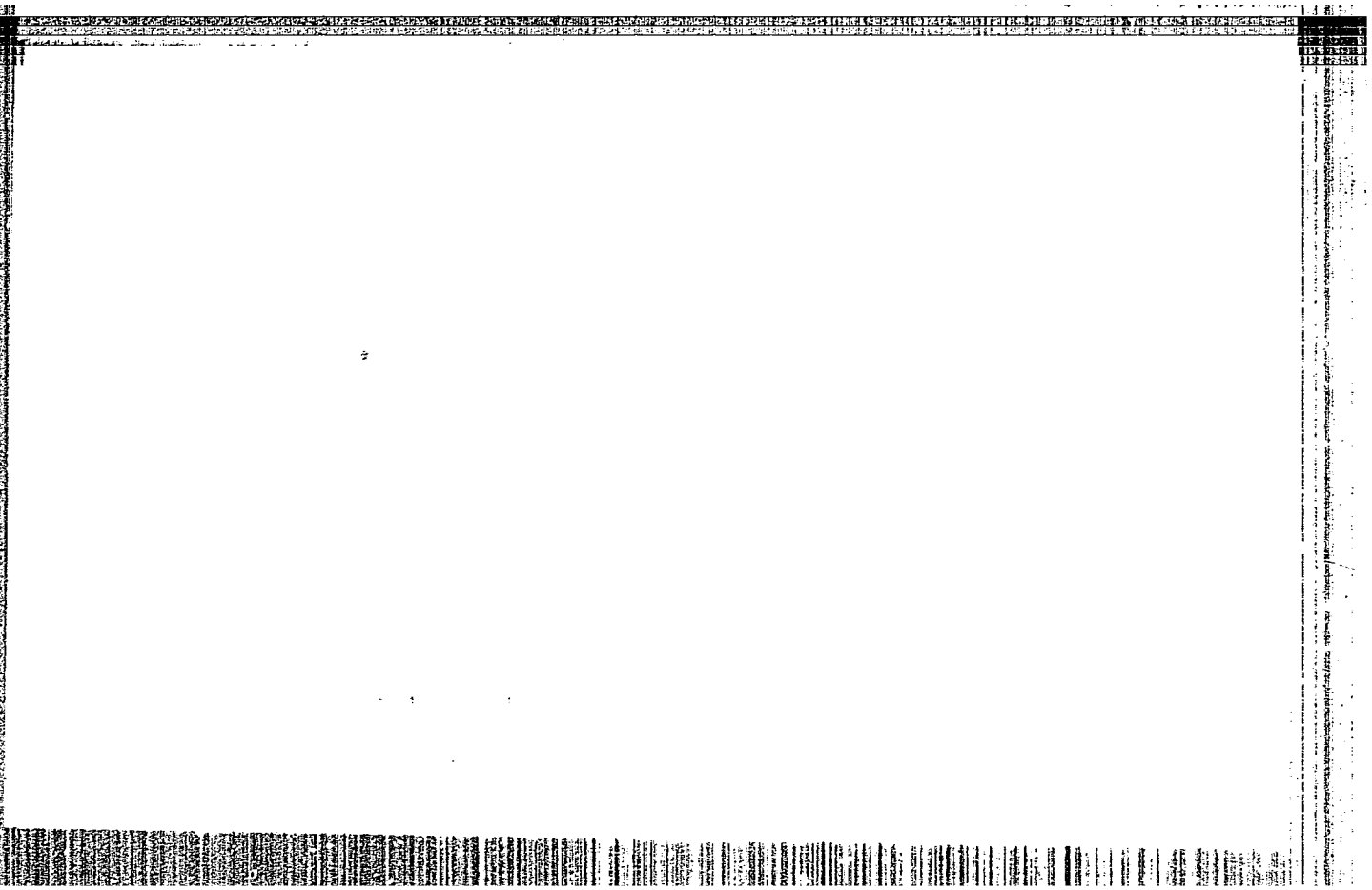
[Drive for drilling rigs] Privod burovykh ustanovok. Izd.2. isp. i dop. Moskva, Izd-vo "Nauka," 1964. 406 p. (MIRA 17:7)

ZHEVAGO, Konstantin Aleksandrovich; BEKMAN, Yu.K., vedushchiy redaktor; POLOSINA, A.S., tekhnicheskiy redaktor

[Internal combustion engines used in well drilling] Dvigateli vnutrennego sgoraniia, primeniaemye v burenii skvazhin. Izd-vo neftianoi i gorno-toplivnoi lit-ry, 1956. 416 p. (MLRA 9:11)
(Gas and oil engines)
(Oil well drilling--Equipment and supplies)

ZHEVAGO, K.A.

Concerning A.T. Gorbunov's remarks. Energomashinostroenie 10 no.10:46 O '64 (MIRA 18:2)



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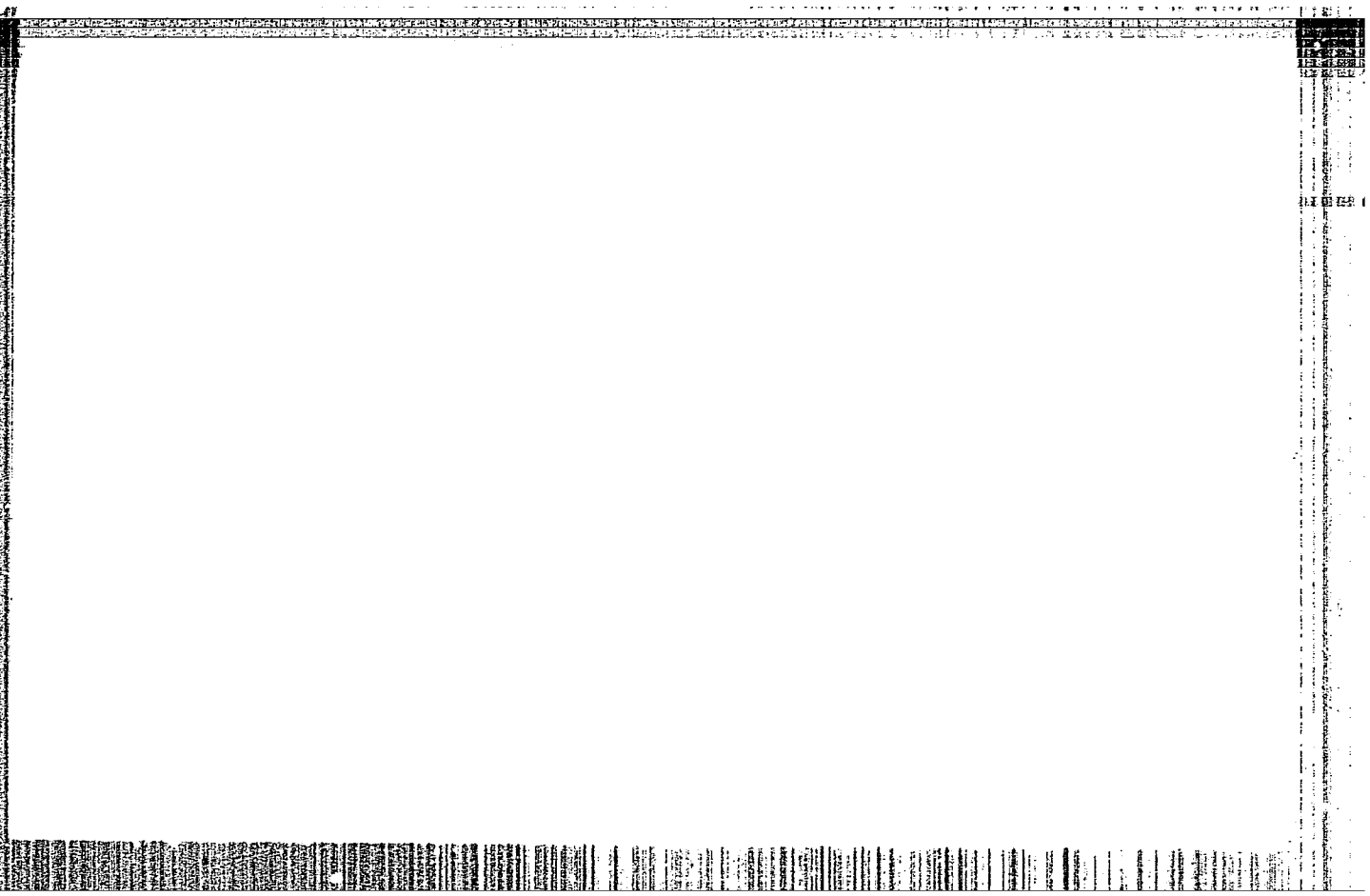

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L 15671-66 EWT(1)

ACC NR: AP6000201 SOURCE CODE: UR/0056/65/049/005/1457/1462

AUTHOR: Bezuglyy, P. A.; Zhevago, S. Ye.; Denisenko, V. I.

ORG: Physicotechnical Institute of Low Temperatures, Academy of Sciences, UkrSSR (Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk UkrSSR)

TITLE: Magnetoacoustic investigation of the Fermi surface of molybdenum

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 5, 1965, 1457-1462

TOPIC TAGS: molybdenum, magnetoacoustic effect, single crystal, magnetic anisotropy, transverse magnetic field, acoustic wave, electromagnetic wave oscillation

ABSTRACT: In view of the fragmentary experimental data published so far on the magnetoacoustic effects in molybdenum, the authors investigated this effect in greater detail by studying the anisotropy of the oscillation periods of the geometrical resonance in transverse magnetic fields when the acoustic wave vector was oriented along the principal crystallographic directions of a single-crystal sample of molybdenum. The measurements at 200 Mc frequency and 4.2K used the pulse procedure of A. A. Galkin and A. P. Korolyuk (PTE, no. 6, 199, 1960). The temperatures were 1.8K in the case of q ∥ [100] and 4.2K in the case q ∥ [110] and [111]. The results showed that in different angle ranges, three different oscillation periods are observed in the absorption coefficient, one short-period and two long-period. It is shown that the short-period oscillations, observed for q ∥ [100], give the dimensions of the electronic surface, while the long-period oscillations are associated

Card 1/2

L 15671-66

ACC NR: AP6000201

with the small hole zones, in accordance with the model proposed by W. H. Lomer (Proc. Phys. Soc., v. 84, 327, 1964). The maximum dimensions of the hole regions are 0.56 x 10^8 cm^{-1} and the minimum 0.42 x 10^8 cm^{-1}. Orig. art. has: 6 figures and 1 formula.

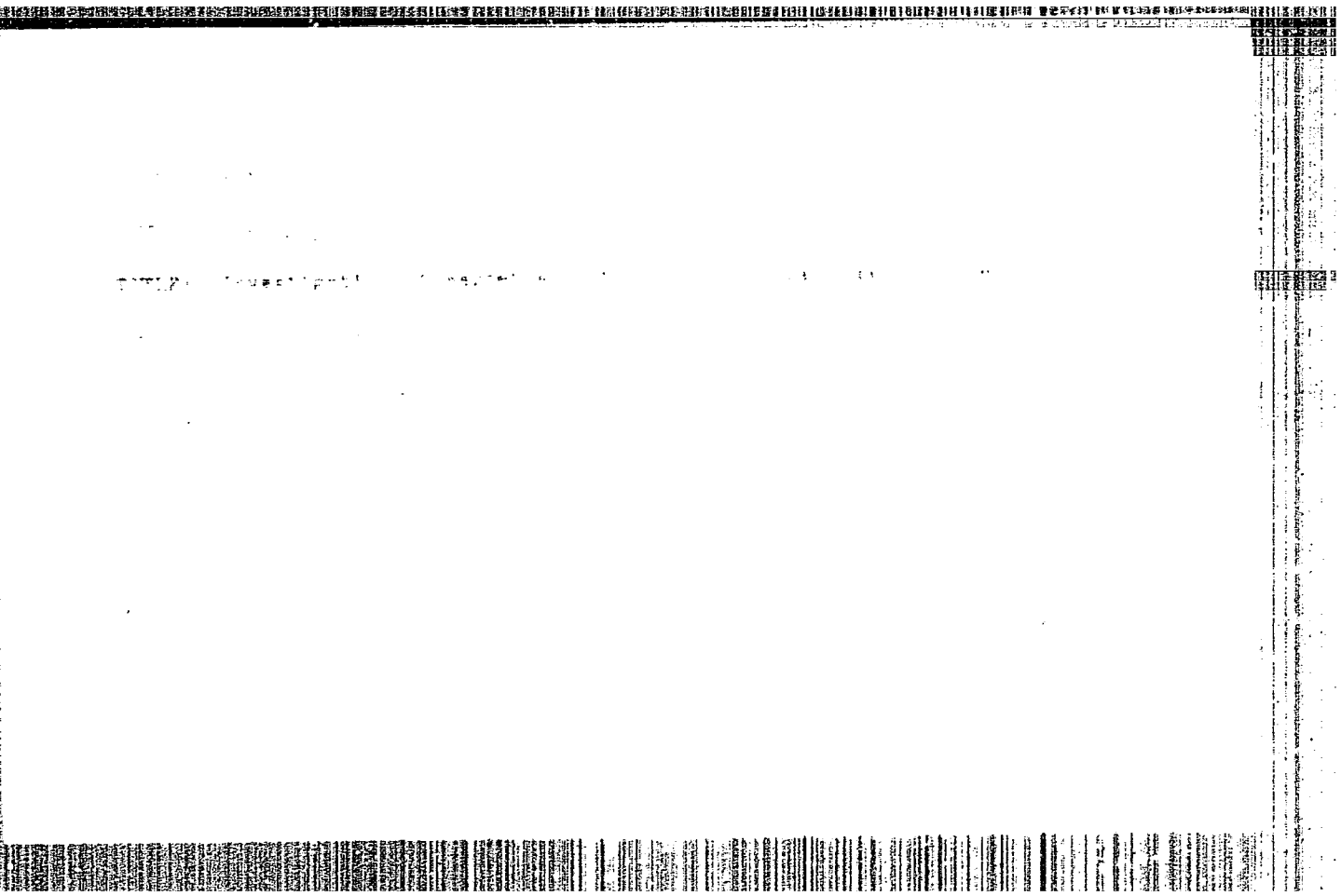
SUB CODE: 20,11/ SUBM DATE: 24Jun65/ ORIG REF: 002/ OTH REF: 011

Card 2/2

BEZUGLYY, P.A.; GALKIN, A.A.; ZHEVAGO, S.Ye.

Magnetoacoustic effects in gallium at 210 Mc. Fiz. tver. tela 7 no.2:480-484 F '65. (MIRA 18:8)

1. Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR, Khar'kov.



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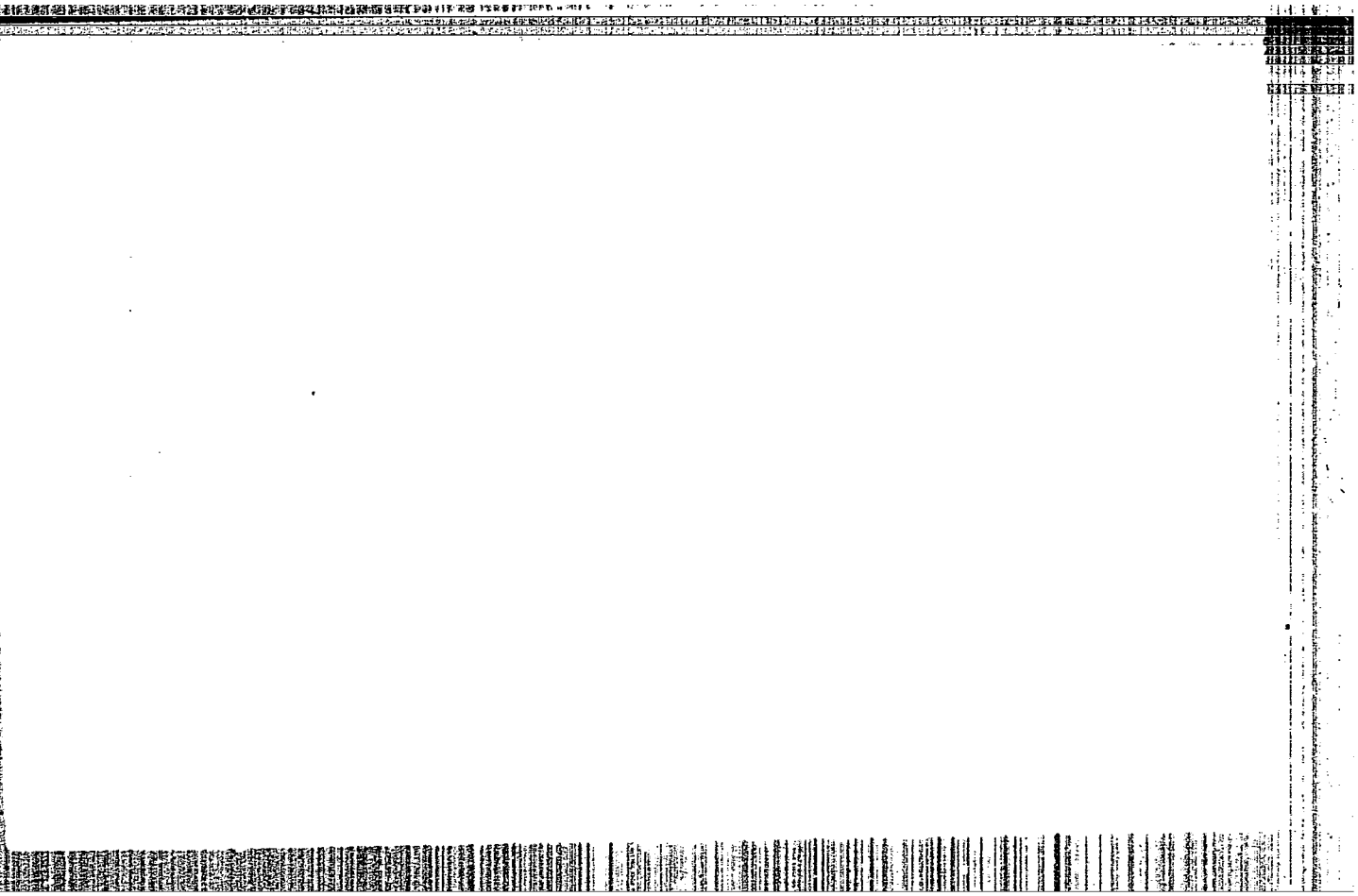

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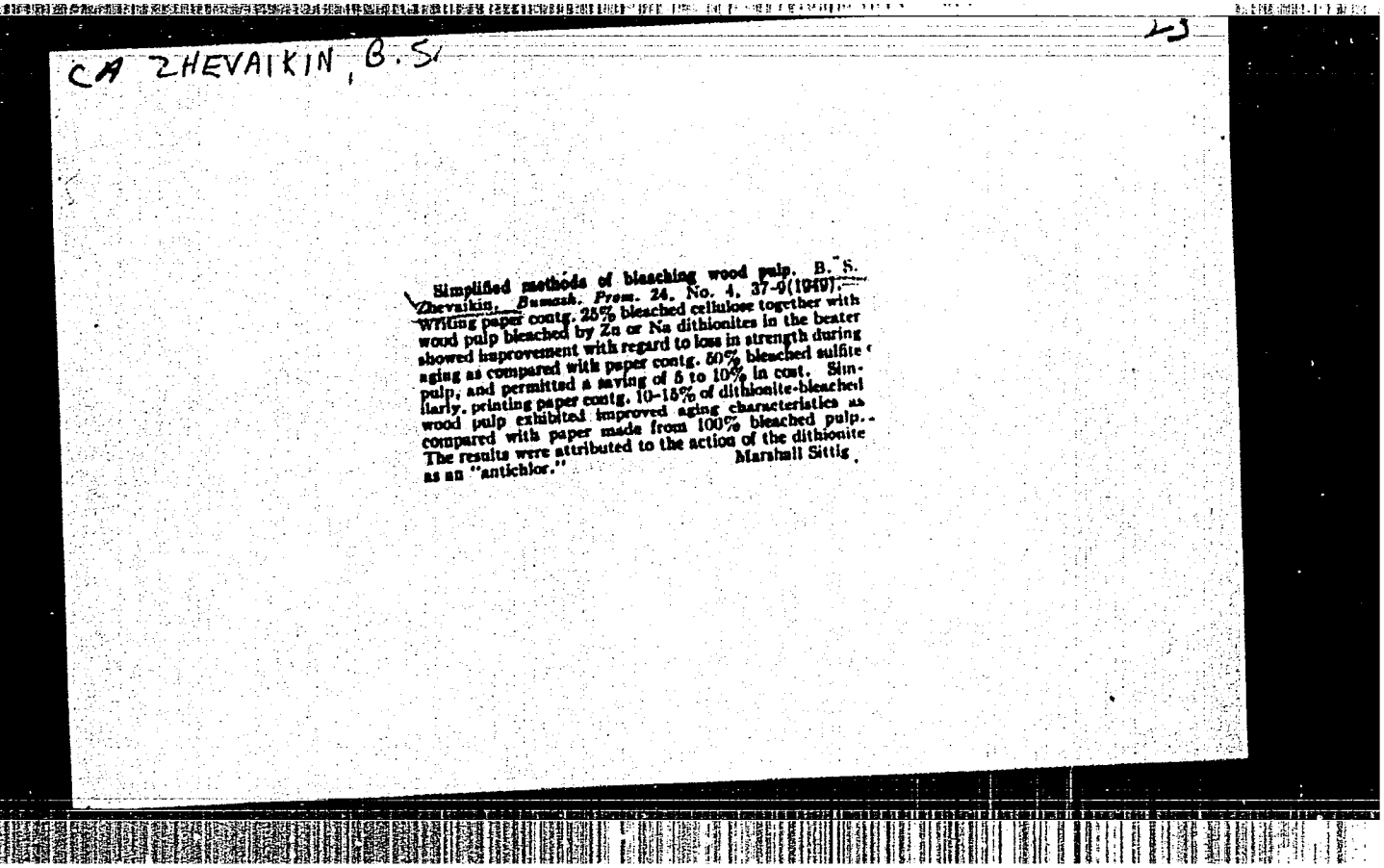
ZHEVAGO, V.S.

Hydrogeological conditions near the Mirgalimsai mines. Izv. AN Kazakh SSR. Ser. geol. no.2:94-104 '57. (MLRA 10:8)
(Mirgalimsai--Water, Underground)



CA ZHEVAIKIN, B.S.

LJ

Simplified methods of bleaching wood pulp. B. S. Zhevaikin. *Bumazh. Prom.* 24, No. 4, 37-9(1949): Writing paper contg. 25% bleached cellulose together with wood pulp bleached by Zn or Na dithionites in the beater showed improvement with regard to loss in strength during aging as compared with paper contg. 50% bleached sulfite pulp, and permitted a saving of 5 to 10% in cost. Similarly, printing paper contg. 10-15% of dithionite-bleached wood pulp exhibited improved aging characteristics as compared with paper made from 100% bleached pulp. The results were attributed to the action of the dithionite as an "antichlor."

Marshall Sittig

ZHEVAKHOV, D.S., dotsent, kand.tekhn.nauk

Increasing the effectiveness of heat exchangers for TV-1000 mercury-arc rectifiers manufactured by the "Uralelektroapparat" Plant. Izv.vys.ucheb.zav.; energ. 2 no.12:66-72 D '59. (MIRA 13:5)

1. Ural'skiy politekhnicheskiy institut imeni S.M.Kirova. Predstavlena kafedroy teploenergeticheskikh ustanovok.
(Heat exchangers) (Electric current rectifiers)

8(3) SOV/143-59-2-9/19

AUTHOR: Zhevakhov, D.S., Candidate of Technical Sciences

TITLE: The Investigation and Improvement of Cooling Devices for Mercury Rectifiers (Issledovaniye i uluchsheniye okhlazhdayushchikh ustroystv rtutno-vypryamitel'nykh ustanovok)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy - Energetika, 1959, Nr 2, pp 68-78 (USSR)

ABSTRACT: The author bases his article on the experience of the plant "Uralelektroapparat" in building cooling equipment for mercury rectifiers and on experience obtained during the operation of this equipment by the Omsk RR line. For cooling mercury rectifiers, a closed primary water circulation cycle is used. The heat is removed from the mercury rectifier housing by distilled water, which in turn is cooled in a heat exchange according to the system water - air. Figure 1 shows a schematic diagram of this cooling system. Initially, for cooling the mercury rectifier RMNV-500 x6, two laminar heat exchangers were

Card 1/6

The Investigation and Improvement of Cooling Devices for Mercury Rectifiers

used (as in the PVS-6 ventilation system) with an axial fan Nr 7 of TsAGI and a centrifugal pump 2K6B for the distilled water. The eight-blade fan was powered by a 1.7 kw motor and had a discharge capacity of 12,000-18,000 m^3/h at a pressure of 14-17 mm. The pump had a capacity of 10-25 m^3/h at 16.5-22 mm water column and was powered by a 2.8 kw motor. The heat removed by this device amounted to 28,000 kcal/h. This performance was unsatisfactory to the plant designers and to the installations operating the rectifier equipment, since it did not provide the necessary cooling effect at 30°C air temperature. An investigation of the available heat exchangers showed that none of the standard types met the requirements for a rectifier cooling unit. Therefore, a new heat exchanger was designed which consisted of 96 tubes of 1 m length, having a surface of 50 m^2. Using the TsAGI fan, about 30,400 kcal/h of heat

Card 2/6

The Investigation and Improvement of Cooling Devices for Mercury Rectifiers

were removed, which is adequate for the RMNV-500x6 rectifier. The plant "Uralelektroapparat" developed on these data a heat exchanger with riffled tubes which was mass-produced later on. At a large number of installations, these cooling units worked satisfactorily, with exception at the Omsk RR, where an air temperature of +40°C and a humidity of 53% were observed. In addition the rectifiers had to work constantly on full capacity. The heat to be removed amounted to 30,000 kcal/h. The series cooling units were therefore inadequate. For this reason experiments were conducted for increasing the heat transfer by spraying the heat exchanger with water. Figure 2 shows the so-called irrigation cooling. It was established that the irrigation cooling increased the heat transfer factor of a riffled surface by at least three times. However, the plant "Uralelektroapparat" was not satisfied with this method, since

The Investigation and Improvement of Cooling Devices for Mercury Rectifiers

the designers feared corrosion effects, rusting, etc. The irrigation cooling proved its effectiveness at a number of RR substations. The plant developed a new type of heat exchanger consisting of oval tubes, as shown by figure 5. Table 2 shows a comparison between the round, riffled tubes and the oval ones, whereby the latter require less space. The difficulties in producing and fastening of the oval tubes have been overcome recently and will not be an obstacle for the mass-production of this new heat exchanger. However, the application of the oval tubes does not solve problems as they occur during summer at the Omsk RR. Therefore various other cooling methods were investigated: 1) using a water - water heat exchanger with a cooling tower; 2) using a Freon refrigerator; and 3) using an ice tank. In his conclusion, the author points out that the refrigeration equipment should not be used,

The Investigation and Improvement of Cooling Devices for Mercury Rectifiers

since the AK-2-FU-30/15 refrigerator unit costs twice as much as a water cooling system with a cooling tower. Ice may be used as a cooling agent only in those areas where it can be readily produced. Experiments conducted in 1936 by Engineer Gogolin showed that about 167 kg/h of ice were required for obtaining a cooling efficiency of 3,000 kcal/h. The author recommends the application of ice tanks for West Siberia, where a cooling unit would be used only during one month in summer. Finally, the author recommends moistening the heat exchanger surfaces on the condition that the latter are protected by a corrosion-resistant coating. There are 5 diagrams, 2 graphs, 2 tables and 1 Soviet reference.

ASSOCIATION: Ural'skiy politekhnicheskiy institut imeni S.M. Kirova (Ural Polytechnical Institute imeni S.M. Kirov)

SOV/143-59-2-9/19

The Investigation and Improvement of Cooling Devices for Mercury Rectifiers

PRESENTED: Kafedra teploenergeticheskikh ustanovok (Chair of Thermal Equipment)

SUBMITTED: August 31, 1958

Card 6/6

8(6) SOV/143-59-12-9/21

AUTHOR: Zhevakhov, D.S., Docent, Candidate of Technical Sciences

TITLE: Raising the Efficiency of TV-1000 Heat Exchangers of Mercury Rectifiers from the "Uralelektroapparat" Plant

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy: Energetika, 1959, Nr 12, pp 66-72 (USSR)

ABSTRACT: This is an account of the TV-1000 heat exchanger, how it works, and its performance figures. It was improved in design by the Kafedra teploenergeticheskikh ustanovok Ural'skogo politekhnicheskogo instituta (Chair of Thermal Power Installations of the Urals Polytechnical Institute) in collaboration with the "Uralelektroapparat" Zavod ("Uralelektroapparat" Plant), and is designed for the circulation cooling of mercury rectifiers on a rectified current of 1000 a by means of distilled water introduced into the cavity of the rectifier: this water is itself cooled by water from the source of supply. Figure 1

Card 1/4

Raising the Efficiency of TV-1000 Heat Exchangers of Mercury Rectifiers from the "Uralelektroapparat" Plant

is a photograph of the TV-1000 heat exchanger, Figure 2a is a diagram of it in its original form and Figure 2b shows it after reconstruction. Table 2 gives performance figures for the heat exchanger before and after the reconstruction. Before, the coefficient for heat exchange was 886, afterwards - 1710 and 3530. Its original drawbacks were that it had only one water passage, the water moved comparatively slowly and the cooling surface was limited. To obviate these, a system of ring pipes was adopted, which increased the heating surface, although the size of the apparatus remained the same. It was very important to raise the efficiency of the heat exchanger without making basic alterations in its production process. Figure 3 shows the altered construction of one of the pipe couplings of the water chambers: nr. 1 indicates the new pipe plate into which 8/10 mm pipes are rolled, placed inside 17/19 mm pipes;

Card 2/4 2 - an additional water chamber; 3 - an additional in-

Raising the Efficiency of TV-1000 Heat Exchangers of Mercury Rectifiers from the "Uralelektroapparat" Plant

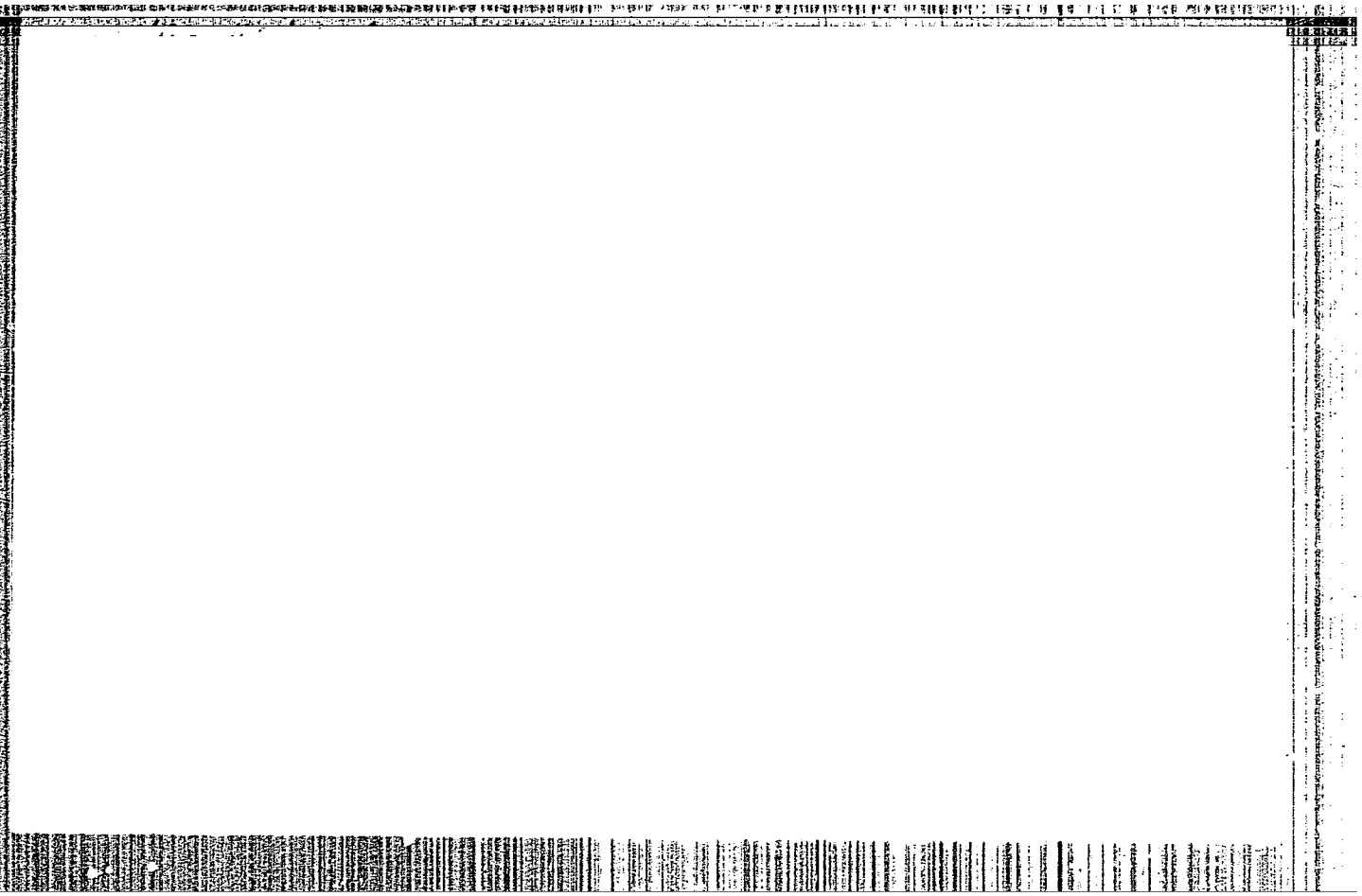
let pipe. Before reconstruction, distilled water from the mercury rectifier entered the space between the ring pipes from inlet 1; after the reconstruction it came through inlet 3 and reached the 8/10 mm pipes. Figure 4 shows the experimental stand. Test conditions corresponded to those for normal operations. Table 1 shows the results. The method put forward by the Czech engineer Schneller [Ref. 1] for comparing the various cooling systems was used. Figure 5 gives the comparative results. The two methods of introducing the water are approximately equal in effect. The relationship of the heat exchange coefficient to consumption of cooling water is shown in Figure 6. A specimen model of the new heat exchanger has been produced at the plant for a mercury rectifier on a rectified current of 10,000 a. It consists of 3 elements, instead of the former 10,

Raising the Efficiency of TV-1000 Heat Exchangers of Mercury Rectifiers from the "Uralelektroapparat" Plant

and is now being tested and perfected. The proposed reconstruction method will greatly increase the efficiency of operating installations and this may be specially important for rectifier substations on electric railways. There are 2 photographs, 3 diagrams, 1 graph, 2 tables and 1 Czech reference.

ASSOCIATION: Ural'skiy politekhnicheskiy institut imeni S.M. Kirova (Urals Polytechnical Institute imeni S.M. Kirov)

SUBMITTED: June 27, 1959, by the Kafedra teploenergeticheskikh ustanovok (Chair of Thermal Power Installations).



APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R002064720012-7"

ZHEVAKHOV, D.S., kandidat tekhnicheskikh nauk.

Selecting the type of nozzle for spraying basins. Elek.sta. 25 no.2:16-17 F '54. (MLRA 7:2)
(Water--Aeration)

MAKARENKO, L.; ZHEVAKHOV, P.

"ABC of automation" by I.I.Krynets'kyi. Reviewed by L.Makarenko, P.Zhevakhov. Nauka i zhyttia 12 no.11:63 N '62. (MIRA 16:1)
(Automation) (Krynets'kyi, I.I.)

GURSHIY, I.O. [Hurzhii, I.O.], doktor istor.nauk; MAKARENKO, L.L.; ZHEVAKHOV, P.I.; DMITRIYENKO, M.F. [Dmytriienko, M.F.], zhurnalist

History of names. Nauka i zhyttia 12 no.1:17 Ja '63. (MIRA 16:3)

1. Chlen-korrespondent AN UkrSSR (for Gurzhiy). 2. Direktor Gosudarstvennyy istoricheskoy biblioteki UkrSSR (for Makarenko). 3. Glavnyy bibliotekar' Gosudarstvennoy istoricheskoy biblioteki UkrSSR (for Zhevakhov).
(Donets Basin--Names, Geographical)

GURZHIY, I. O.[Hurzhii, I. O.]; MAKARENKO, L. L.; ZHEVAKHOV, P. I.; DMITRIYENKO, M. F.[Dmytriienko, M. F.], zhurnalist

History of names. Nauka i zhyttia 12 no.2:33 F '63. (MIRA 16:4)

(Ukraine--Names, Geographical)

ROGAL', P.D.; ZHEVAKHOVA, T.S.

Isolated subcutaneous separation of the trachea. Khirurgiia 36 no.1:110-111 Ja '60. (MIRA 13:10)
(TRACHEA—WOUNDS AND INJURIES)

ZHEVAKHOVA, T.S., zasluzhennyy vrach UkrSSR (Cherkassy (obl.), ul. Shevchenko, dom 242)

Ossifying hematoma of the elbow joint. Ortop., travm. i protez. no.8:65-66 '62. (MIRA 17:10)

ZHEVAKHOVA, T.S., zasluzhennyy vrach USSR

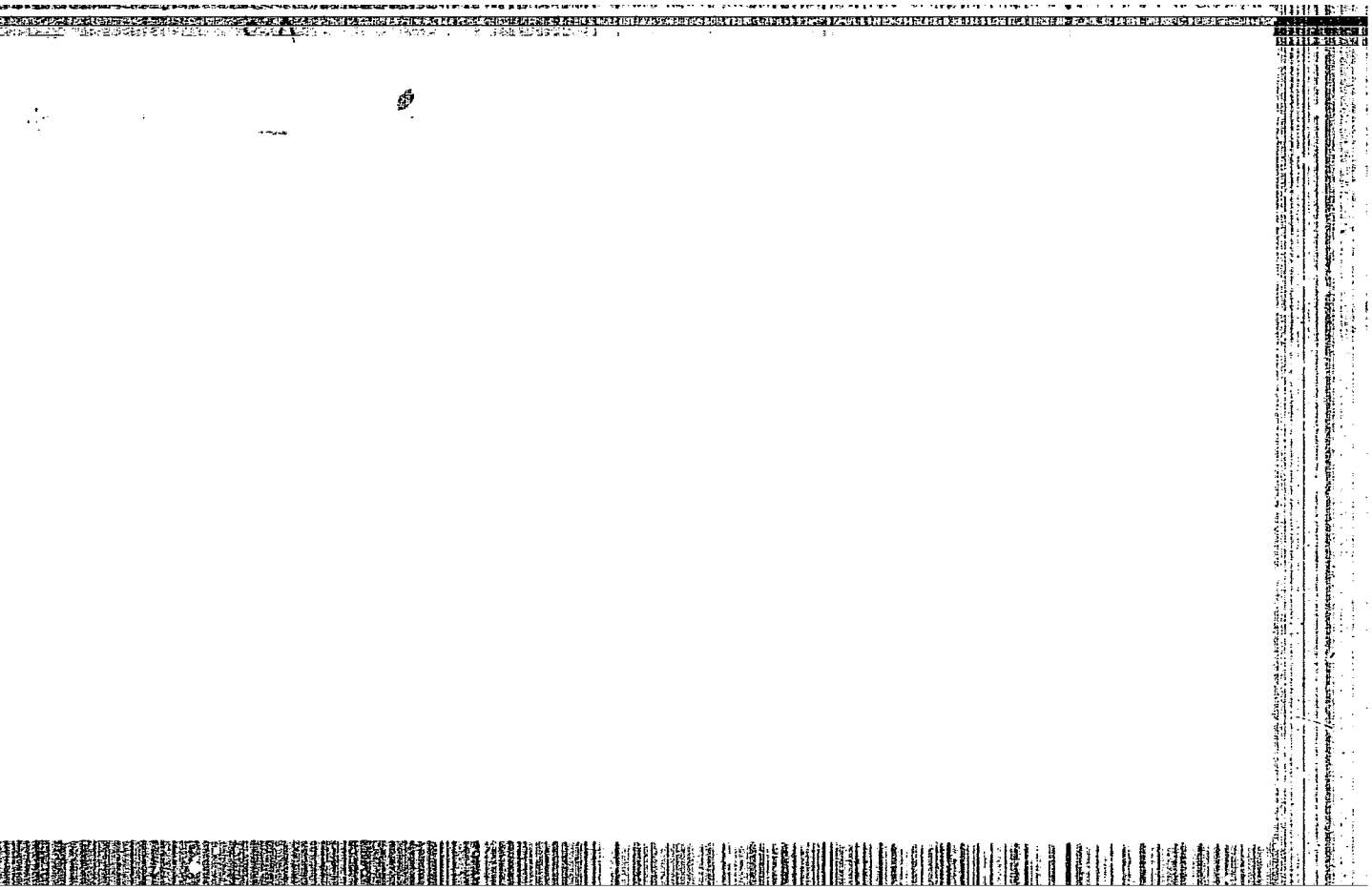
Treatment of epicondylitis. Ortop.,travm.i protez. 20 no.12: 57 D '59. (MIRA 13:5)

1. Iz ortopedicheskogo otdeleniya Cherkasskoy gorodskoy bol'nitsy.
(HUMERUS--DISEASES)

ZHEVAGO, Konstantin Aleksandrovich; PORTNOY, Teodor Zinov'yevich; SHKOL'NIKOV, Bernard Markovich. Prinimal uchastiye SUD, I.I.. MARTYNOVA, M.P., vedushchiy red.; POLOSINA, A.S., tekhn.red.

[Boring equipment drives] Privod burovykh ustanovok. Moskva, Gos.nauchno-tekhn.izd-vo neft. i gorno-toplivnoi lit-ry, 1960. 362 p. (MIRA 13:6)

(Boring machinery)



APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R002064720012-7"

ZHEVAKIN, S. A. PA 36/49T76

USSR/Physics Sep 48
Astronomy
Stellar Mechanics

"Auto-Oscillation of an Ionized Hydrogen Layer as the Cause of Tsefeid's Variations," S. A. Zhevakin, Gor'kiy Physicotech Res Inst, Gor'kiy State U, 4 pp

"Dok Ak Nauk SSSR" Vol LXII, No 2

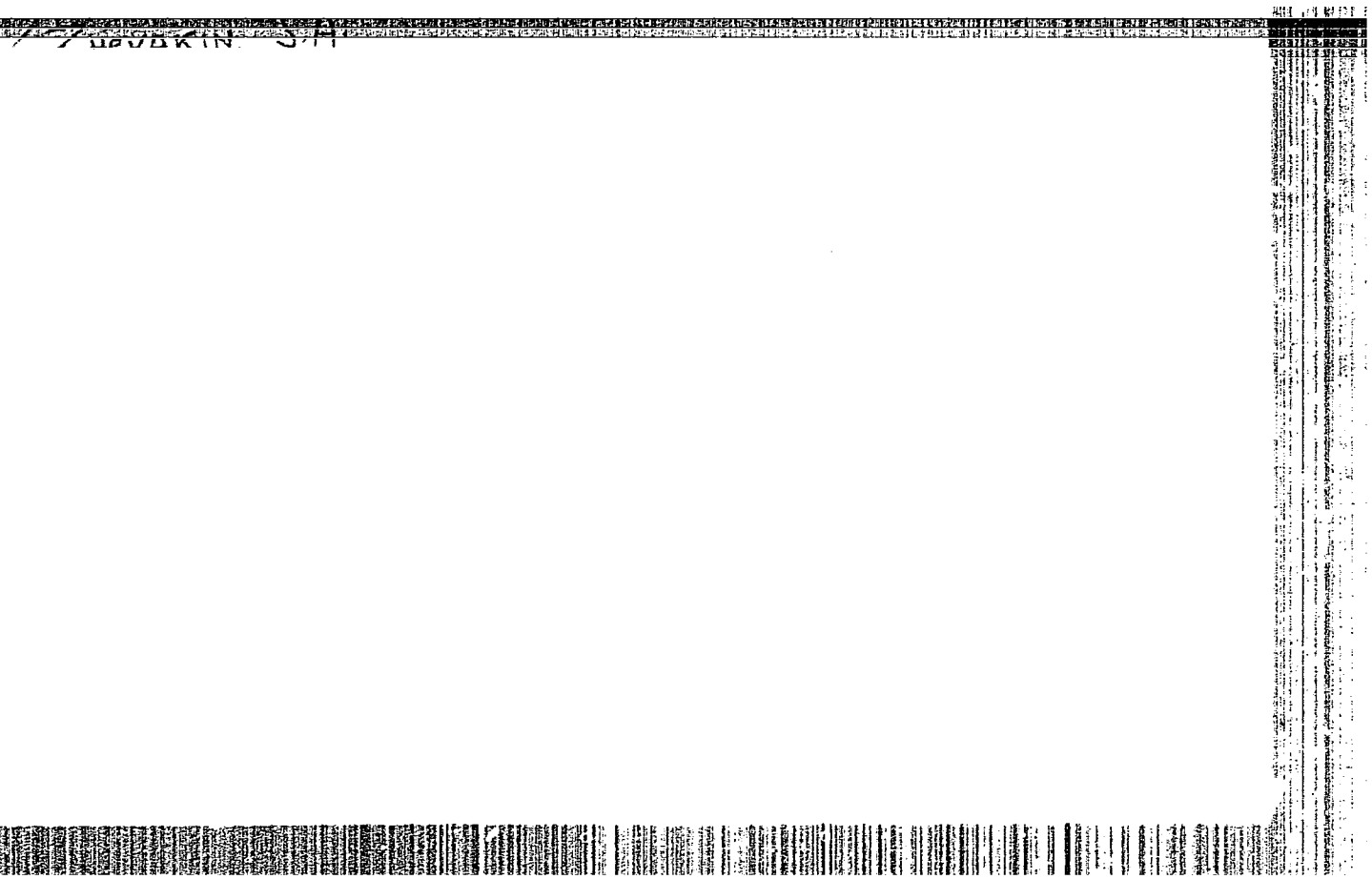
Attempts to point out the mechanism supporting Tsefeid's auto-oscillations, linked with "dynamic instability" of the equilibrium state in spherical layer of stars, when the spherical

[redacted] 36/49T76

USSR/Physics (Contd) Sep 48

layer is in critical ionization condition. Submitted by Acad A. A. Andronov, 13 Jul 48.

[redacted] 36/49T76



ZHEVAKIN, S. A.

USSR/Astronomy - Stellar Fluctuations Jan/Feb 52

"Discrete Model of Star (Oscillations and Explosion). I," S. A. Zhevakin, Gor'kiy Phys-Tech Res Inst

"Astron Zhur" Vol XXIX, No 1, pp 37-48

Shows that properties of such model are similar to those of models available in astrophys literature. Studies auto-oscillations of model with one deg of freedom, sustained by action of swinging mechanism connected to thermonuclear energy release. Shows that nuclear reactions are not the cause of stellar oscillations. Received 15 Feb 51.

202T5

USSR/Astronomy - Star Model Jan/Feb 53

"Discrete Model of Star. II," S. A. Zhevakin, Phys-Tech Res Inst, Gor'kiy State U

"Astron Zhur" Vol 30, No 1, pp 52-63

Presents construction of nonconservative discrete model of a star with two degrees of freedom, applicable to study of oscillations of stars. Discusses examples illustrating application of model for determination of gravitational stability of ionized zone and determination of effect of ionization on period of oscillation of star. Received 23 Jun 52.

246T40

1. ZHEVAKIN. S. A.

2. USSR (600)

4. Stars, Variable

7. On the theory of the Cepheids. Part 1, Astron. zhur., 30, No. 2, 1953.

Attempts to prove that variability of Cepheids is due to a zone of doubly ionized H_e on their periphery and therefore knowledge of internal structure of star is not essential. Theory of Cepheids may be helpful for classification of internal structure of variables. Received 23 Jun 52. 251T5

9. Monthly List of Russian Accessions, Library of Congress, April, 1953, Uncl.

AID - P-231

Subject : USSR/Astronomy

Card : 1/2

Author : Zhevakin, S. A.

Title : On the Theory of Stellar Changeability. II (Phase Displacement between the Variations in Brightness and in Radial Velocity in the Cepheid and Long-period Variables)

Periodical : Astron. zhur., v. 31, 2, 141-153, Mr - Ap 1954

Abstract : Unsoundness of known present-day attempts to explain the phase displacement between the variations in radial velocity and in brightness of variable stars is demonstrated. A multilayer discrete model of a fluctuating non-adiabatic envelope of a star is constructed. On the basis of this model a theory is developed of non-adiabatic pulsations of the envelope. The theory is of interest: 1) in the study of auto-variations of variable stars of "large sequence", the variations being sustained by the negative dissipation created in the zone of critical ionization He II; and 2) for the study of the conditions

Astron. zhur., v. 31, 2, 141-153, Mr - Ap 1954, (additional card)

AID - P-231

Card : 2/2

of the origin of the phase displacement between the variations in radial velocity and in the brightness, characteristic of the cepheids and long-period variables. Formulae. 23 references (after 1938), 9 Russian.

Institution: Gor'kov Physico-Technical Institute, Gor'kov University

Submitted : July 5, 1953

ZHEVAKIN, S.A.

Subject : USSR/Astronomy AID P - 427

Card 1/2 Pub. 8, 6/16

Author : Zhevakin, S. A.

Title : On the Theory of Stellar Changeability. III (Phase Displacement between the Variations in Brightness and in Radial Velocity in the Cepheids and Long-period Variables)

Periodical : Astron. zhur., v. 31-4, 335-357, Jl-Ag 1954

Abstract : (See Part II of this article, AID P-231). Demonstrated: that under certain conditions a phase lag between the maximum emission of radiation and the phase of maximum contraction of a star is equivalent to $\frac{1}{4}$ of the oscillation period. Simultaneously negative dissipations appear producing auto-oscillations in the star. The author establishes that in a single layer atmosphere of a star a succeeding radiation emission will not change the phase displacement in the cepheids. Formulae, 10 tables, 5 graphs, 7 references.

Astron. zhur., v. 31-4, 335-357, Jl-Ag 1954 AID P - 427

Card 2/2 Pub. 8, 6/16

Institution : Gor'kiy Physico-Technical Institute, Gor'kiy University

Submitted : July 5, 1953

USSR/ Physics Radio wave propagation

Card : 1/1 Pub. 118 - 7/7

Authors : Getmantsev, G. G., Zhevakin, S. A., Kobrin, M. M., and Miller, M. A.

Title : Propagation of radio waves

Periodical : Usp. fiz. nauk 53/2, 298 - 303, June 1954

Abstract : The book "Propagation of Radio Waves", written by V. M. Kessenikh, is criticized. Many fundamental errors in interpretation of the subject covered by the book were found. Also, the unmethodical arrangement of many experimental data, included in the book, render it useless even for reference. In short, the publication of the book by the "Gostekhizdat" (State Publ. House for Tech. Literature) is considered to be erroneous.

Institution : ....

Submitted : ....

ZHEVAKIN, S.A.

USSR/Astronomy - δ Cephei

Card 1/1 Pub. 22 - 8/40

Authors : Zhevakin, S. A.

Title : Regarding the theory of star variability

Periodical : Dok. AN SSSR 99/2, 217-220, Nov 11, 1954

Abstract : A theory on the variability of the I and II Class (after Baade) stars (δ Cephei type) is described. The theory adequately explains almost all phenomena observed. It is based on the assumption of a radial self-oscillation of stars due to the so-called "negative dissipation" of energy, which occurs in critical zones of helium II ionization and which in return is due to the high-temperature of the zones T(= 35,000-55,000°. Five references, 3-USSR (1933-1954). Diagram.

Institution : Physico-Technical Institute of the State University at Gorkiy

Presented by: Academician M. A. Leontovich, June 16, 1954

USSR/ Astronomy - Variable stars

Card 1/1 Pub. 22 - 4/40

Authors : Zhevakin, S.A.

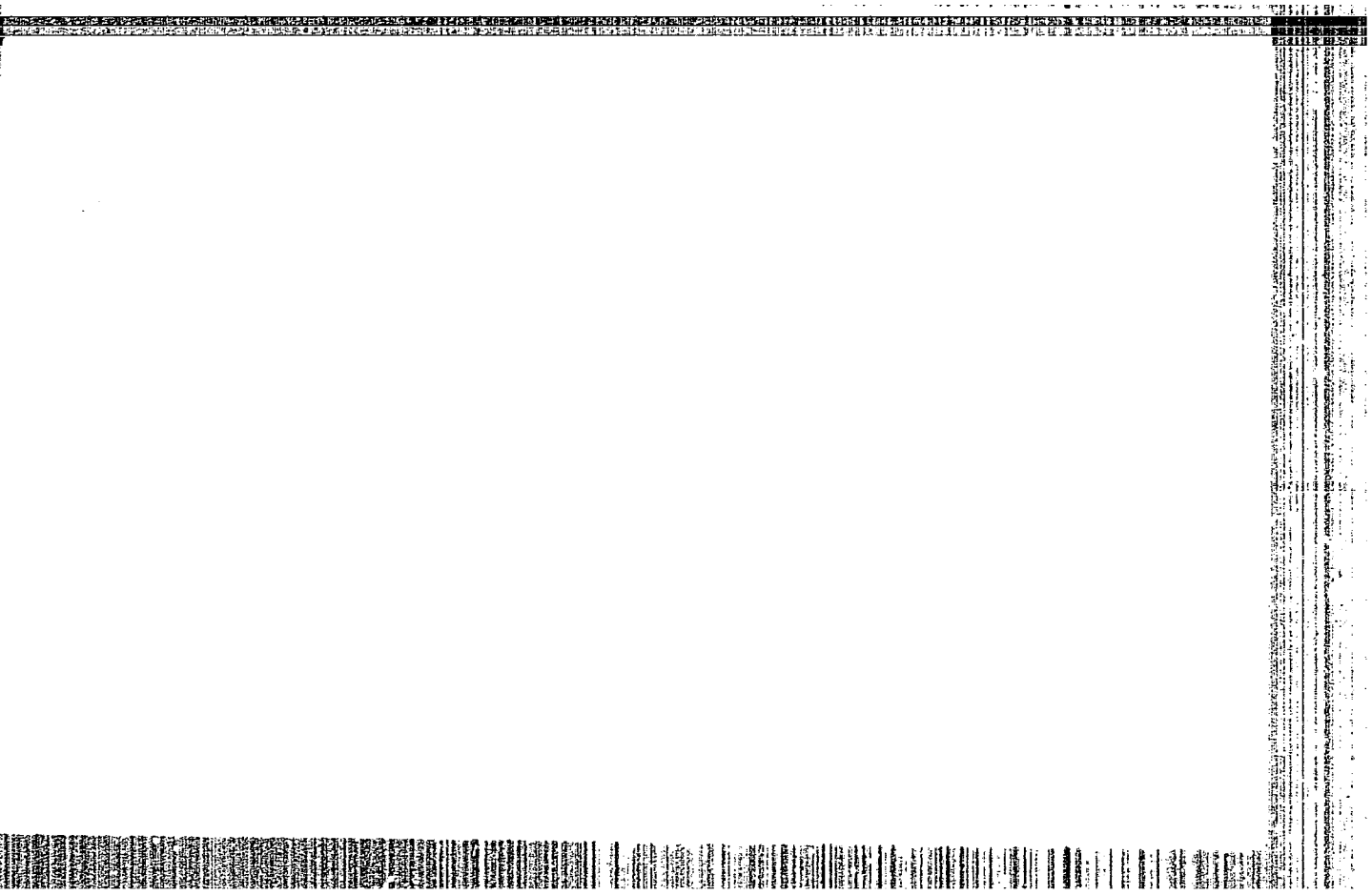
Title : On phase lagging in glitter variations (vibrations) with respect to those in energy radical-velocity

Periodical : Dok. AN SSSR 99/3, 353-356, Nov 21, 1954

Abstract : The phase lagging in glitter variations with respect to those in energy radical-velocity of variable stars is explained. The explanation is presented analytically. The correctness of the analysis is proved by substitution of a sample of exemplary data obtained through actual observation of 8 Cephes. Five references; 3-USSR (1947-1954). Diagrams; graph.

Institution: Gorki State University

Presented by: Academician M.A. Leontovich, June 16, 1954



APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R002064720012-7"

ZHEVAKIN, S.A.

USSR / Radio Physics. Propagation of Radio Waves. I-6

Abs Jour : Ref Zhur - Fizika No 3, 1957, No 7318

Author : Zhevakin, S.A., Kobrin, M.M.
Inst: : Gor'kov University
Title : Calculation of the Field Intensity of the Sky Wave at Short Radial Waves.

Orig Pub : Uch. zap. Gor'kovsk. un-ta, 1956, 30, 92-136

Abstract : A method is proposed for calculating the field intensity of the space wave in the case of ionospheric propagation; this method takes into account separately the absorption in various ionizing layers. Calculations are given for the absorption in the D layer and for the case of reflection from the E, F_1, and F_2 layer. Equations for the absorption coefficient, obtained by using a model of a simple layer, make it possible to calculate the field intensity from specified radiation and propagation conditions (transmitter power, directivity pattern and impedance of the antenna, wavelength, zenith angle of the sun χ, and the length and

Card : 1/2 - 43 -

USSR / Radio Physics. Propagation of Radio Waves. I-6

Abs Jour : Ref Zhur - Fizika No 3, 1957, No 7318

Abstract : direction of the communication route) using the quantity $f_{OE} = f_{cr_E} \cos^{\frac{1}{4}}\chi$ (if f_{cr_E} is the critical frequency of the E layer), which depends on the solar activity, and using the universal constants B_D and A_E, determined from the field-comparison results. The equations obtained were experimentally confirmed in the 25 -- 120 meter band. Empirical equations suitable for the field intensity during night time propagation, as well as many nomograms to facilitate the calculations, are also given. Bibliography, 36 titles.

Card : 2/2 - 44 -

Zhevakin, S. A.

USSR/Radiophysics - Radio-wave Propagation. Ionosphere, I-6

Abst. Journal: Referat Zhur - Fizika, No 12, 1956, 35298

Author: Zhevakin, S. A., Fayn, V. M.

Institution: None

Title: On the Theory of Nonlinear Effects in the Ionosphere

Original Periodical: Zh. eksperim. i teor. fiziki, 1956, 30, No 3, 518-527

Abstract: In the calculation of the nonlinear effects in the ionosphere, the authors use a velocity distribution function for the electrons, obtained by one of the authors (Referat Zhur - Fizika, 1956, 1313) for the case of propagation of an amplitude-modulated high frequency field of arbitrary amplitude E_0, in the presence of a permanent magnetic field. This makes it possible to calculate the values of the cross-modulation and other nonlinear ionospheric effects without assuming the magnetic field of the wave to be small, as was done earlier by other authors. It is shown that even at transmitter powers greater than 250 kw and under usual conditions of radiation and propagation of

Card 1/2

USSR/Radiophysics - Radio-wave Propagation. Ionosphere, I-6

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35298

Abstract: radio waves, a noticeable deviation occurs from the results of the approximate theory of cross-modulation (linear with respect to the square of the amplitude of the field E_0 of a strong station). Thus, in the example under consideration, at a transmitter power of 500 kw, the factor characterizing the depth of the cross-modulation, assuming collisions between the electrons and molecules, is calculated from the exact theory to be 0.465, but the linear approximation (with respect to E_0^2) results in [illegible] assuming collision with ions, this factor becomes 0.455 and 0.056 respectively. A calculation is made of the nonlinear effect of phase self-modulation, occurring upon the passage through the ionosphere of an amplitude-modulated radio-wave. It is shown that this effect amounts to several radians per second, i.e., it can be detected experimentally, and used to study the ionosphere. Bibliography, 10 titles.

Card 2/2

ZHEVAKIN, S.A.

Energy transfer in a medium of nonhomogeneous temperature with turbulent convection. Astron.Zhur. 33 no.2:137-143 Mr-Ap '56. (MLRA 9:8)

1. Fiziko-tekhnicheskiy institut Gor'kovskogo gosudarstvennogo universiteta.

(Heat--Convection)

PHASE I BOOK EXPLOITATION 704

Zhevakin, S. A.

Teoriya pul'satsionnoy zvezdnoy peremennosti; avtoreferat dissertatsii na soiskaniye uchenoy stepeni doktora fiziko-matematicheskikh nauk (Pulsation Theory of Stellar Variability; Abstract of a Dissertation Offered for the Degree of Doctor of Physical and Mathematical Sciences) Leningrad, 1957. 8 p. 150 copies printed.

Sponsoring Agency: Leningradskiy ordena Lenina gosudarstvennyy universitet imeni A.A. Zhdanova.

PURPOSE: This booklet is the author's abstract of his dissertation for the degree of Doctor of Physical and Mathematical Sciences and is intended for advanced students of astronomy and professional astronomers.

COVERAGE: The object of the dissertation is to present a theory of pulsation variability for variable stars of "large sequence"

Card 1/5

population I and "large sequence" population II (Baade). Each of these sequences is characterized by its own correlations of the spectrum and luminosity periods. The existence of these correlations which relate variable stars of the Cepheid type, semi-regular and irregular variables, and the long-period variables entering into each of the sequences leads to the postulate of a common nature of variability of these star types. The theory assumes that the helium content in the atmospheres of variable stars is 10 to 15 percent by the number of atoms. The theory leads to several conclusions concering the helium content in atmospheres of variable stars, the masses of variable stars, the degree of concentration of mass of the variable star at its center, the role of convection in transferring energy within the ionized zone of the variable star, etc. The author states that his study represents a first attempt to apply this theory in this direction and by no means exhausts all possibilities.

Pulsation Theory of Stellar Variability (Cont.) 704

The dissertation consists of 7 chapters, each of which the abstract annotates. Ch. I., the introduction, deals with the physical content of the theory of stellar variability and the principal results to which it leads. In Ch. II an analysis is given of ordinary oscillations of a distributed stellar model in a quasi-adiabatic approximation. Dissipation of energy of the star's own ordinary oscillations is determined by this approximation. Ch. III discusses the non-adiabatic oscillations of the ionized zone and the stellar atmosphere above it as observed with the aid of a single-layer discrete model. The single-layer model is selected with the view of getting its quasi-adiabatic oscillations as close as possible to the quasi-adiabatic oscillations of the distributed model analyzed in Ch. II. It is indicated that the use of an ordinary single-layer discrete model brings qualitatively correct results. In Ch. IV. the non-adiabatic oscillations of the star's envelope are calculated with the aid of a 5-layer discrete model, which makes more precise the results obtained in Ch. III.

Card 3/5

The next chapter indicates that the transfer of energy on the envelope in variable stars must take place by radiation and not by convection. Ch. VI deals with non-adiabatic oscillations of the stellar model. The similarity of ordinary non-adiabatic oscillations of a distributed model to the corresponding adiabatic oscillations of the same model testify to the fact that ordinary oscillations may be studied on a discrete model, so long as the latter's nonadiabatic oscillations remain close to the adiabatic oscillations of the same discrete model. This supports the method of discrete treatment of non-adiabatic stellar oscillations, which forms the basis of this dissertation. The error of D.A. Frank-Kamenetskiy on non-adiabatic stellar oscillations and the Cepheid theory is also pointed out. The last chapter refutes the objections of D.A. Frank-Kamenetskiy to the theory of stellar variability presented in the dissertation. The objections of L.E. Gurevich and A.I. Lebedinskiy are also reviewed and traced to a misunderstanding. The conclusions of the author's dissertation have

Pulsation Theory of Stellar Variability (Cont.) 704

already appeared in articles published in the Astronomichesky Zhurnal, 1953, 1954, and 1955; Doklady Akademii nauk, 1954; Sbornik pamyati akad. A.A. Andronova, AN SSSR, 1955; Trudy soveshchaniya po voprosam kosmogonii, AN SSSR, 1955. There are no references.

AVAILABLE: Library of Congress (QB835.Z46)

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11-22-58

Card 5/5

ZHEVAKIN, S. A. Doc Phys-Math Sci -- (diss) "Theory of sidereal-pulsation variability." Len, 1957. 9 pp (Len Order of Lenin State Univ im A. A. Zhdanov), 150 copies (KL, 44-57, 98).

[redacted], S.A.

Central and peripheral theories of Cepheid pulsations [with summary in English]. Vop. kosm. 5:84-122 '57. (MLRA 10:8)
(Stars, Variable)

3(1)

AUTHOR: Zhevakin, S.A.

SOV/33-35-4-7/25

TITLE: The Dissipation of the Energy of Oscillation of a Pulsating Star (O dissipatsii energii kolebaniy pul'siruyushchey zvezdy)

PERIODICAL: Astronomicheskiy zhurnal, 1958, Vol 35, Nr 4, pp 583-596(USSR)

ABSTRACT: The author deduces an approximative expression for the energy dissipation of a radial, fundamental quasidiabatic oscillation of a star under radiative transfer of energy. The error of the obtained expression is shown to be at most 4%. The formula of the author gives informations on the paramaters on which the dissipation of oscillation energy actually depends, provided that the concentration of mass of the star towards the center is sufficiently high. It is of interest for the theory of stellar variability.

Card 1/2 Gor'kiy Sci Res Physico-Technical Inst.

124-58-9-9570

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 9, p 16 (USSR)

AUTHOR: Zhevakin, S. A.

TITLE: On the Self-excited Oscillations of Variable Stars of the "Great Sequence" (Ob avtokolebaniyakh peremennykh zvezd "bol'shoy posledovatel'nosti")

PERIODICAL: V sb.: Pamyati Aleksandra Aleksandrovicha Andronova. Moscow, Izd-vo AN SSSR, pp 629-656

ABSTRACT: A summary of the results of preceding works of the author (ref. Astronom. zh., 1953, Vol 30, Nr 2, pp 161-179; 1954, Vol 31, Nr 2, pp 141-153; Nr 4, pp 335-337) on the perturbation theory of the oscillation of stars as applied to the He II ionization zone. Assuming that the shell of a star is constructed according to a polytrope with index 3, the values of the radius and the mass that satisfy the theory are sought. For δ Cephei a radiant flux $L=7.9 \times 10^{36}$ erg/sec is obtained for $R_o = 48R_\odot = 3.36 \times 10^{12}$ cm and $M=6.75M_\odot = 1.35 \times 10^{34}$ g. The revised value of the mass is significantly lower than the value that corresponds to the mass/radiant-flux ratio. The values obtained for the radius agree well with Wesselink's

Card 1/2

On the Self-excited Oscillations of Variable Stars (cont.)

results (Wesselink, A., Bull. Astron. Inst. Netherl., 1947, Vol 10, Nr 380); by contrast, the results of the photoelectric measurements by Stebbins (Stebbins, J., Astrophys. J., 1945, Vol 101, Nr 1) cannot be reconciled with theory. The calculation is extremely sensitive to the assumed value of the index of the polytrope; thus, for a polytrope with index 3.5 the parameter of the nonadiabatic oscillation of the zone would have been 3.8 times as large.

D. A. Frank-Kamenetskiy

1. Stars--Oscillations 2. Perturbation theory--Applications 3. Oscillations --Theory

Card 2/2

ZHEVAKIN, S.A.; TROITSKIY, V.S.; TSEYTLIN, N.M.

Atmospheric radio emission and investigation of absorption of centimeter radio waves. Izv.vys.ucheb.zav.; radiofiz. 1 no.2: 19-26 '58. (MIRA 11:11)

1.Issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete.
(Microwaves) (Atmosphere)

AUTHOR: Zhevakin, S. A. 20-119-5-18/59

TITLE: A Uniform Interpretation of Various Types of the Pulsation-Dependent Stellar Variability (O yedinoy interpretatsii razlichnykh tipov pul' satsionnoy zvezdnoy peremennosti)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 5, pp. 907-910 (USSR)

ABSTRACT: The author shows that on the basis of the calculation of the non-adiabatic oscillations of a multilayer discreet spherical model of a stellar shell (in linear approximation) that all known types of pulsation-dependent stellar variability (which are distinguished by phase relations between the oscillations of brightness and the oscillations of the stellar radius) can be obtained from this model with various values of one of the parameters of the model. This parameter is the parameter y_{zone} of the non-adiabaticity of the oscillations of the zone of critical ionization of He II. In the case of the long-period variable stars of the

Card 1/3

type O Ceti the beginning of the period of maximum brightness passes the period of the maximum compression of the stars by 1/4 of the oscillation period. Besides there are long-period variable stars in the case of which these two periods approximately coinciding. The last type is called RR Herculis-type according to one of its representatives. The same phase displacement as RR-Her is also displayed by the variable stars of the type ß Can Maj. The shell of such stars consists of a zone with double critical ionization of helium and of the stellar atmosphere situated above it. In the case of a given dependence of the non-transparency coefficient of the stellar shell on the density and the temperature (dependent on the chemical composition), the character of the non-adiabatic oscillations mainly depends on the value of the parameter y_{zone} as well as on the value of the ratio $m_{atmosphere}/M_{zone}$, while the residual parameters are of only little influence. A diagram shows the displacement of the phase Ψ between the epochs of maximum brightness and the minimum of the

Card 2/3

stellar radius, as well as the ratio between the amplitude of the radiation current on its emission from the star and the maximum of the amplitude of the radiation current which is reached before its entering the ionized zone. After this the various types of stellar reaction are discussed consecutively. There are 1 figure, 1 table, and 22 references, 6 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom gosudarstvennom universitete im. N. I. Lobachevskogo (Radiophysical Scientific Research Institute of Gor'kiy University imeni N. I. Lobachevskiy)

PRESENTED: December 9, 1957, by M. A. Leontovich, Member, Academy of Sciences, USSR

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3(1)

AUTHOR: Zhevakin, S. A. SOV/20-123-2-11/50

TITLE: On the So-Called "Relation Period-Luminosity" of Cepheids (O tak nazyvayemom "sootnoshenii period-svetimost' " u tsefeid)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 2, pp 252-255 (USSR)

ABSTRACT: A revision of the relation period-luminosity for the classical Cepheids (which was undertaken by the author on a 200-inch telescope because of Baade's (Ref 2) observations) showed the unreliability of statistical determinations hitherto carried out of the above-mentioned zero from self-motions and from trigonometric parallaxes, and how much optimism had been displayed by the authors of earlier papers when estimating the error limits of the zero values found by them. The author first gives a short report on a theory he developed in 1953. In December 1957 Sandidge (Sandidzh), at the 90th session of the American Astronomical Society, he described his investigations of the period-luminosity ratio of Cepheids. According to Sandidge a spread $1^m.2$ of luminosity corresponds to a given value of the period; thus, instead of a curve period-luminosity, a strip of the breadth $1^m.2$ is obtained. Thus, an unexpectedly good confirm-

Card 1/4

ation of the theoretically predicted spread of $1^m.2$ could be given by means of the experimental results obtained by Sandidge. A diagram shows the results obtained by Sandidge for the galactic Cepheids. The author then shows how to explain Sandidge's results by means of the theory of the variability of stars. His investigations are based on the following assumptions: a) The variable stars have homologous internal structures. b) The shells of variable stars contain one and the same quantity of helium. c) The degree of ionization of He II does not depend on gas pressure and is determined solely by temperature. d) The shells of variable stars are constructed by means of the polytropic index n. In the case of a given period $P \sim \sqrt{R^3/M}$, the relation $R \sim \sqrt[3]{M}$ then holds, where R and M denote the radius and the mass of the stars respectively. For the temperature in the shell it holds that $T \sim Mu/R$, where u denotes the Emden function with the index n. In the zone of critical ionization it holds that $u \sim R/M$. Next, it is assumed that the luminosity L_0 of the star does not depend on mass, and that the masses of the Cepheids (at last within their various

Card 2/4

groups (short-period- long-period- etc.)) are approximately equal. It then holds that $u_{zone} \sim L_o$. Here u_{zone} denotes the parameter of the non-adiabaticity of the oscillations of the zone of critical ionization of He II in a variable star. With a given period P the following variability of stars of the Cepheid type is possible: $\Delta m = 2.5 \Delta \lg L_o = 2.5 \cdot 0.5 = 1^m.25$, which agrees well with the value $1^m.2$ found by Sandidge. The true spread of luminosity is probably within the interval of $0^m.8 < \Delta m < 1^m.25$. With a given period, Cepheids with great luminosity must have a smaller amplitude of self-oscillations than Cepheids of the same period with a lower degree of luminosity. There are 2 figures and 20 references, 10 of which are Soviet.

On the So-Called "Relation Period-Luminosity" of Cepheids SOV/20-123-2-11/50

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Card 4/4

SOV/109-4-1-4/30

AUTHORS: Zhevakin, S. A. and Troitskiy, V. S.

TITLE: Absorption of Centimeter Waves in a Stratified Atmosphere (Pogloshcheniye santimetrovykh voln v sloistoy atmosfere)

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 1, pp 21-27 (USSR)

ABSTRACT: The article gives complete formulae for the evaluation of the absorption in the atmosphere, which take into account the curvature of the Earth and the refraction. The formulae permit the calculation of the absorption for centimetre waves by using the temperature and the absolute humidity at the Earth's surface as the basic data. A path L between points 1 and 2 at heights h_1 and h_2 in the atmosphere is considered (see the figure on p 22). The complete expression for the reflection coefficient at a height h is given by:

$$\varkappa = \varkappa_1 \varphi_1(h) + \varkappa_2 \varphi_2(h) \quad , \qquad (1)$$

where $\varkappa_1$ is the absorption coefficient due to the presence

Card 1/5

Absorption of Centimeter Waves in a Stratified Atmosphere

of hydrogen and $\varkappa_2$ is the absorption coefficient due to water vapours; φ_1 and φ_2 are functions of height such that $\varphi_1(0) = \varphi_2(0) = 1$ and $\varphi_1(\infty) = \varphi_2(\infty) = 0$. The absorption in an element of length $d\ell$ is equal to $e^{-\varkappa(h)d\ell}$, so that the total absorption is expressed by Eq.(2), where J and J_o are field intensities at any point in the presence of absorption and in the absence of absorption, respectively. Since $d\ell$ can be expressed by Eq.(5), where n_1 is the refraction coefficient at point 1 and n is the refraction coefficient at a given point of the path L, the total attenuation coefficient for the wave can be written in the form of Eq.(6). This can also be written as Eq.(7), where quantities l_1 and l_2 are expressed by Eqs.(8). The quantities l_1 and l_2 denote the effective path lengths in a dry atmosphere and in the presence of water vapours. The pressure and the temperature for the standard atmosphere at a height h can be represented by Eqs.(9). On the other hand, the absolute humidity at a height h is given by Eq.(11) where ρ_o is the humidity at $h = 0$ and H_0 is a

Card 2/5

Absorption of Centimetre Waves in a Stratified Atmosphere

characteristic quantity for the water vapour which, for the USSR, is equal to about 2.6 km. The absorption coefficient due to the hydrogen is expressed by Eq.(13) where D is a constant, ν is frequency, T is the absolute temperature of the hydrogen, N is the molecular concentration of the hydrogen, $\Delta\nu$ is the width of the absorption line and $\delta = \Delta\nu/c$. For the waves of 1.5 to 10 cm the hydrogen absorption coefficient can be simply expressed by Eq.(14). For the standard atmosphere the function φ_1 can therefore be expressed by Eq.(18). On the other hand, the function φ_2 , which takes into account the absorption due to the presence of water vapours, is expressed by Eq.(22). The final expression for the absorption coefficient is therefore given by:

$$\varkappa(h) = \varkappa_1 e^{-\frac{h}{H_1}} + a\rho_0 e^{-\frac{h}{H_2}} , \qquad (24)$$

Card 3/5

Absorption of Centimeter Waves in a Stratified Atmosphere

where H_1 = 5.3 km and H_2 = 2.1 km. The quantities l_1 and l_2 can therefore be expressed by Eqs.(27), provided the simplification defined by Eq.(25) is adopted; a_e in Eqs.(27) denotes the effective Earth radius. The quantity l of Eqs.(27) can be expressed by Eq.(29) or Eq.(30); this can also be written as Eq.(31). Similarly, l_2 can be expressed by Eq.(32). Function f(t) in Eqs.(31) and (32) is evaluated in Table 1. Eqs.(31) and (32) were used to determine l_1 and l_2 for various L , Θ_1 and h_2 . The values obtained are shown in Table 2; these were calculated for H_1 = 5.3 km, H_2 = 2.2 km and a_e = 9000 km. From the table it is seen that the maximum effective path length in a dry atmosphere does not exceed 274 km and that in the water vapour of the atmosphere is less than 176 km. The authors express their gratitude to

Absorption of Centimeter Waves in a Stratified Atmosphere

N. M. Tseytlin for his help in this work. The paper contains 1 figure, 2 tables and 6 references; 1 reference is English, 1 French and 4 are Soviet.

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Card 5/5